Exam.Code:0935
Sub. Code: 6670

2063

B.E. (Electrical and Electronics Engineering)

Fifth Semester

PC-EE-503: Electromagnetic Fields Theory

Time allowed: 3 Hours **Max. Marks: 50**

NOTE: Attempt five questions in all, including Question No. I which is compulsory and selecting two questions from each Part. Use of scientific calculator is allowed.

x-x-x

I. (a) Express the value of differential volume *dv* in rectangular and cylindrical Co-ordinate systems. **(2)**

(b) What are the differences between Poisson's and Laplace equations. **(2)**

(c) Determine electric flux density at distance of 20cm due to an infinite sheet of uniform charge $20\mu C/m^2$ lying on z=0 plane. **(2)**

(d) Show that the displacement current through a parallel plate capacitor is equal to the conduction current I flowing in the external circuit. **(2)**

(e) State Poynting theorem. Give its significance. **(2)**

Part- A

II. (a) State and prove Stokes' theorem. **(5)**

(b) Obtain expression for Laplacian operator in the cylindrical coordinates. **(5)**

III. (a) Drive an expression for the electric field due to a straight and infinite Uniformly charged wire of length 'L' meters and with a charge density of + c/m at a point P which lies along the perpendicular bisector of wire. **(5)**

(b) Apply Gauss's law to find the expression for Electric field Intensity and Electric flux density due an infinite line charge distribution. **(5)**

IV (a) Obtain Poisson's and Laplace's equations for a homogeneous material. **(5)**

(b) State and explain the continuity equation for current. **(5)**

Part-B

V. (a) Apply Biot-Savart law and determine an expression for magnetic field intensity at a point due to an infinitely long straight conductor carrying current I. **(5)**

(b) Find electric field due to charged ring on its axis. **(5)**

VI. (a) Derive the expression of inductance of solenoid having N turns. **(5)**

(b) Derive Electromagnetic wave equation for conducting and non-conducting medium. **(5)**

VII (a) Derive the Maxwell's equations in both integral and point form. **(5)**

(b) A coaxial cable carries a dc voltage V and current I. Show that the power flow is VI using Poynting's theorem. **(5)**

x-x-x